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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,676	04/05/2001	Jin-Wen Tzeng	P-1026	3516

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EXAMINER

OWENS, DOUGLAS W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 10/31/2002

10

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/826,676

Applicant(s)

TZENG ET AL.

Examiner

Douglas W Owens

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Objections

2. Claims 3-5 are objected to because of the following informalities: The term "thermal plastic" should be replaced with "thermoplastic". Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 6,075,287 to Ingraham et al.

Regarding claim 1, Ingraham et al. teaches an isolated thermal interface (12, 12a) comprising a flexible (resilient) graphite sheet (Col. 6, lines 12-25) including particles of graphite and having two major surfaces, at least one surface coated with a protective coating (16) that would have inhibited flaking of the particles of graphite. Ingraham et al. does not explicitly teach that the flexible graphite sheet comprises natural graphite. It would have been obvious to one of ordinary skill in the art to use a known material, such as GRAFOIL®, since it is well suited for the

intended use. GRAFOIL®, an expanded and compressed natural graphite, manufactured by Graftech, a subsidiary of Union Carbide, is well known for its desirable thermal properties and use in electronics as heat sinks and thermal interfaces. See related US patent 3,404,061 to Shane et al. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Regarding claim 2, Ingraham et al. teaches a thermal interface wherein the protective coating comprises a thermoplastic material (Col 5, lines 24-35).

Regarding claim 3, Ingraham et al. teaches a thermal interface, wherein the thermoplastic material comprises a polyimide.

Regarding claims 4 and 9, Ingraham et al. does not explicitly teach a protective coating that is no more than 0.025 millimeters or 0.015 millimeters in thickness. Ingraham et al. is silent with respect to the thickness of the protective coating. One having ordinary skill in the art would have been required to arrive at the optimal thickness of the protective coating through routine experimentation. Additionally, it has been held that optimization of a result effective variable is within the purview of one having ordinary skill in the art.

Regarding claim 5, Ingraham et al. teaches a thermal interface, wherein the protective coating is sufficient to electrically isolate the coated major surface of the flexible graphite sheet (Col. 5, lines 24-28).

Regarding claim 7, Ingraham et al. teaches a thermal interface, further comprising a layer of adhesive interposed between the protective coating and flexible graphite sheet (Col. 5, lines 30-35).

Regarding claim 8, Ingraham et al. does not teach a thermal interface, wherein the adhesive is selected from the group consisting of acrylic and latex materials. It would have been obvious to one of ordinary skill in the art to select acrylic or latex since they are known materials that are well suited for the intended use.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ingraham et al. as applied to claims 1-5 above, and further in view of US patent No. 5,834,337 to Unger et al.

Ingraham et al. does not teach a thermal interface, wherein the graphite sheet has edge surfaces that are coated with a protective coating to inhibit flaking. Unger et al. teaches a thermal interface, wherein edges of the graphite interface are coated with a protective coating (Col. 4, lines 13-19). It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Unger et al. into the device taught by Ingraham et al. since it is desirable to prevent graphite particles from contaminating undesired areas of the device.

6. Claims 10-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ingraham et al. in view of Unger et al.

Regarding claims 10, 11 and 13, Ingraham et al. teaches a process for producing a thermal interface having a protective coating (16) sufficient to inhibit flaking of graphite, the process comprising:

forming a flexible graphite sheet into the size and shape desired for a thermal interface;

wherein the flexible graphite sheet has at least one major surface and at least one edge surface; and

coating the major surfaces with material to form a protective coating.

Ingraham et al. does not teach that the material forms a protective boundary about the flexible graphite sheet. Unger et al. teaches a thermal interface, wherein edges of the graphite interface are coated with a protective coating (Col. 4, lines 13-19) such that the protective boundary is formed about the thermal interface. It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Unger et al. into the device taught by Ingraham et al. since it is desirable to prevent graphite particles from contaminating undesired areas of the device.

Ingraham et al. does not explicitly teach that the graphite sheet has its direction of greater thermal conductivity parallel to the major surface. Ingraham et al. teaches a resilient graphite sheet that has excellent thermal properties. It would have been obvious to one of ordinary skill in the art to select known resilient graphite sheet, such as an expanded graphite sheet produced by Union Carbide sold under the trade name of GRAFOIL®, since it is well suited for the intended use. GRAFOIL® is known to have greater thermal conductivity in a direction parallel to the major surface (See Col. 13, lines 10-23 of Shane et al.).

Regarding claim 12, neither Ingraham et al. nor Unger et al. teach coating the graphite sheet by spray coating, roller coating or hot laminating press. The

cited references are silent with respect to how the protective coating is applied, so one having ordinary skill in the art would have been required to select a known method of applying the protective coating. It would have been obvious to one of ordinary skill select spray coating, roller coating or hot laminating press since these are known methods of applying a protective coating.

Regarding claim 14, Ingraham et al. teaches a process, wherein the material is coated on the flexible graphite sheet by laminating with adhesive (Col. 5, lines 30-35). Neither Ingraham et al. nor Unger et al. explicitly teach cutting the flexible graphite sheet after coating the sheet with laminate. It would have been obvious to one of ordinary skill to cut the flexible graphite sheet into the desired shape and size, since it is desirable for the graphite to fit properly in the device. It would have further been obvious to coat the flexible graphite sheet either before or after cutting, since it has been held that choosing an order of processing steps only involves routine skill in the art (See *Ex parte Rubin*, 128 USPQ 440).

Regarding claim 15, Ingraham et al. teaches a process, wherein the material comprises a thermoplastic material.

Regarding claim 16, Ingraham et al. teaches a process, wherein the material comprises a polyimide.

Regarding claims 17 and 20, Ingraham et al. does not teach a process wherein the protective coating that is no more than 0.025 millimeters or 0.015 millimeters in thickness. Ingraham et al. is silent with respect to the thickness of the protective coating. One having ordinary skill in the art would have been

required to arrive at the optimal thickness of the protective coating through routine experimentation. Additionally, it has been held that optimization of a result effective variable is within the purview of one having ordinary skill in the art.

Regarding claim 18, Ingraham et al. teaches a process, further comprising a layer of adhesive interposed between the protective coating and flexible graphite sheet (Col. 5, lines 30-35).

Regarding claim 19, Ingraham et al. does not teach a process, wherein the adhesive is selected from the group consisting of acrylic and latex materials. It would have been obvious to one of ordinary skill in the art to select acrylic or latex since they are known materials that are well suited for the intended use.

Response to Arguments

7. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DWO
October 24, 2002

A handwritten signature in black ink, appearing to read "Tom Thomas". The signature is written in a cursive style with a horizontal line above the first name.

TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800